

Application No.: 10/721,941

Amendment to the Claims:

Claim 1 (Canceled)

Claim 2 (Canceled and rewritten as claim 15)

Claim 3 (Currently amended): The amplifier circuit as set forth in Claim 2 15 wherein said first modulator includes a variable delay, said second modulator includes a variable attenuator, and one of said first and second modulators includes a variable phase shifter.

Claim 4 (Original): The amplifier circuit as set forth in Claim 3 including a first control having a detector connected to said error amplifier, a loop filter connected to said detector and to one of said first and second modulators,

whereby said first control controls said one of said first and second modulators and thereby keeps amplitude and phase balanced at said first combiner.

Claim 5 (Currently amended): The amplifier circuit as set forth in Claim ~~2~~ 15 wherein said second circuit means includes a third modulator connected to said first circuit means, a fourth modulator connected to said output, and a second combiner connected to said third and fourth modulators,

whereby said third and fourth modulators receive and modulate said amplifier generated noise and said output signal, respectively, to match the amplitude and shift the phase by 180 degrees of said amplifier generated noise and said output signal, and said second combiner combines said amplifier generated noise and said output signal to cancel said amplifier generated noise from said output signal.

Claim 6 (Original): The amplifier circuit as set forth in Claim 5 wherein third modulator includes a variable attenuator, said fourth modulator includes a variable delay, and one of said third and fourth modulators includes a variable phase shifter.

Claim 7 (Original): The amplifier circuit as set forth in Claim 6 including a second control having a detector connected to said second combiner, a loop filter connected to said detector and to one of said third and fourth modulators,

whereby said second control controls said one of said third and fourth modulators and thereby keeps amplitude and phase balanced at said second combiner.

Claim 8 (Currently amended): The amplifier circuit as set forth in Claim ~~1~~ 15 wherein said third circuit means includes a fifth modulator, a sixth modulator connected to said input for receiving said input signal, a detector connected to said fifth modulator and to said first circuit means, a loop filter connected to said detector and to said fifth modulator, said detector receiving said input signal from said fifth modulator and said amplifier generated noise from said first circuit means, using said input signal as a reference, downconverting said amplifier generated noise to around a frequency other than the frequency of said carrier, and separating amplitude fluctuations from phase fluctuations, and therefrom generating a control signal, and said fifth modulator receiving said input signal and said control signal, modulating said input signal in response to said control signal and transmitting said input signal to said primary amplifier.

Claim 9 (Original): The amplifier circuit as set forth in Claim 8 wherein said fifth modulator includes a variable phase shifter and a variable attenuator, and said sixth modulator includes a variable delay and a variable attenuator.

Claim 10 (Original): An amplifier circuit, for providing noiseless amplification of an input signal having a carrier, comprising:

- a primary amplifier having an input for receiving said input signal and an output for providing an amplified output signal,

- a first circuit having a first modulator with a variable delay connected to said input, a second modulator with a variable phase shifter and a variable attenuator connected to said output, a first combiner for combining said input signal from said first modulator and said output signal from said second modulator and isolating thereby amplifier generated noise, and an error amplifier for receiving said amplifier generated noise from said first combiner and amplifying said amplifier generated noise,

- a second circuit having third modulator with a variable delay connect to said output, a fourth modulator with a variable phase shifter and a variable attenuator connected to said error amplifier, and a second combiner configure to receive said output signal from said third modulator, to receive said amplifier generated noise from said fourth modulator, and to superposition said output signal and said amplifier generated noise to cancel said amplifier

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generated noise from said output signal, and

a third circuit having a fifth modulator with a variable phase shifter and a variable attenuator, a sixth modulator with a variable delay and a variable attenuator and connected to said input for receiving said input signal, a first detector connected to said fifth modulator and to said error amplifier, a loop filter connected to said first detector and to said fifth modulator, said first detector for receiving said input signal from said fifth modulator and said amplifier generated noise from said error amplifier, using said input signal as a reference to downconvert said amplifier generated noise to around a frequency other than the frequency of said carrier, and separating amplitude fluctuations from phase fluctuations, and therefrom to generating a first control signal, and said fifth modulator for receiving said input signal and said first control signal, modulating said input signal in response to said first control signal and transmitting said input signal to said primary amplifier.

Claim 11 (Original): The amplifier circuit as set forth in Claim 10 including a first control having a second detector connected to said error amplifier, a second loop filter connected to said second detector and to said first modulator,

whereby said first control controls said first modulator to keep amplitude and phase balanced at said first combiner.

Claim 12 (Original): The amplifier circuit as set forth in Claim 11 including a second control having a third detector connected to said second combiner, a third loop filter connected to said third detector and to said third modulator,

whereby said second control controls said third modulator to keep amplitude and phase balanced at said second combiner.

Claim 13 (Currently amended): An oscillator circuit comprising:

a resonator,

a phase modulator connected to said resonator,

an amplifier circuit connected to said resonator and said phase modulator, for providing noiseless amplification of an input signal having a carrier, said amplifier circuit including:

a primary amplifier having an input for receiving said input signal and an output for providing an amplified output signal,

a first circuit means, connected to said input and said output, for isolating amplifier generated noise, said first circuit means including a first modulator connected to said input, a second modulator connected to said output, a first combiner connected to said first and second modulators and an error amplifier connected to said first combiner,

whereby said first and second modulators receive and modulate said input and output signals, respectively, to match the amplitude and shift the phase by 180 degrees of said input and output signals, and said first combiner combines said input and output signals to isolate said amplifier generated noise,

a second circuit means, connected to said first circuit means and to said output, for superpositioning said amplifier generated noise onto said output signal to cancel said amplifier generated noise from said output signal, and

a third circuit means, connected to said input and to said first circuit means, for mixing said input signal and amplifier generated noise to produce a first control signal, and modulating one of said input signal and said output signal in response to said first control signal.

Claim 14 (Currently amended): A mixer circuit comprising:

first and second amplifier circuits, each for providing noiseless amplification of an input signal having a carrier and each including:

a primary amplifier having an input for receiving said input signal and an output for providing an amplified output signal,

a first circuit means, connected to said input and said output, for isolating amplifier generated noise, said first circuit means including a first modulator connected to said input, a second modulator connected to said output, a first combiner connected to said first and second modulators and an error amplifier connected to said first combiner,

whereby said first and second modulators receive and modulate said input and output signals, respectively, to match the amplitude and shift the phase by 180 degrees of said input and output signals, and said first combiner combines said input and output signals to isolate said amplifier generated noise,

a second circuit means, connected to said first circuit means and to said output, for superpositioning said amplifier generated noise onto said output signal to cancel said amplifier generated noise from said output signal, and

a third circuit means, connected to said input and to said first circuit means, for mixing said input signal and amplifier generated noise to produce a first control signal, and

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modulating one of said input signal and said output signal in response to said first control signal, and

a frequency mixer connected to said first and second amplifier circuits and configure to receive and mix said output signals from said first and second amplifier circuits.

Claim 15 (New): An amplifier circuit, for providing noiseless amplification of an input signal having a carrier, comprising:

a primary amplifier having an input for receiving said input signal and an output for providing an amplified output signal,

a first circuit means, connected to said input and said output, for isolating amplifier generated noise, said first circuit means including a first modulator connected to said input, a second modulator connected to said output, a first combiner connected to said first and second modulators and an error amplifier connected to said first combiner,

whereby said first and second modulators receive and modulate said input and output signals, respectively, to match the amplitude and shift the phase by 180 degrees of said input and output signals, and said first combiner combines said input and output signals to isolate said amplifier generated noise,

a second circuit means, connected to said first circuit means and to said output, for superpositioning said amplifier generated noise onto said output signal to cancel said amplifier generated noise from said output signal, and

a third circuit means, connected to said input and to said first circuit means, for mixing said input signal and amplifier generated noise to produce a first control signal, and modulating one of said input signal and said output signal in response to said first control signal.